

CLAIMS:

1. A portable biological data collection system comprising:
 - a biological data sensor for engaging a patient for sensing biological data from the patient; and
 - a portable biological data collection device connected to the biological data sensor by a flexible connection, the portable biological data collection device comprising:
 - an amplifier for amplifying the sensed biological data from the biological data sensor to produce an amplified signal;
 - an analog-to-digital converter for digitizing the amplified signal to produce a digitized signal; and
 - a personal computer card interface for relaying the digitized signal to a host computer on a real-time basis as the biological data is sensed by the biological data sensor, and for supplying electrical power from the host computer to the amplifier and the analog-to-digital converter.
2. The portable biological data collection system of claim 1, wherein the portable biological data collection device further comprises a personal computer card housing, wherein the amplifier, the analog-to-digital converter, and the personal computer card interface are disposed within the personal computer card housing.
3. The portable biological data collection system of claim 2, wherein the portable biological data collection device further comprises:

an analog-to-digital timing circuit disposed within the personal computer card housing for communicating with the analog-to-digital converter for producing a sampling timing signal; and
a storage buffer disposed within the personal computer card housing for receiving the digitized signal from the analog-to-digital converter for outputting the digitized signal;
wherein the personal computer card interface supplies electrical power from the host computer to the analog-to-digital timing circuit and the storage buffer.

4. The portable biological data collection device of claim 1, wherein the flexible connection comprises a hollow tube.

5. The portable biological data collection system of claim 4, wherein the portable biological data collection device further comprises a personal computer card housing, wherein the amplifier, the analog-to-digital converter, and the personal computer card interface are disposed within the personal computer card housing.

6. The portable biological data collection system of claim 5, wherein the portable biological data collection device further comprises:

an analog-to-digital timing circuit disposed within the personal computer card housing for communicating with the analog-to-digital converter for producing a sampling timing signal; and

a storage buffer disposed within the personal computer card housing for receiving the digitized signal from the analog-to-digital converter for outputting the digitized signal; wherein the personal computer card interface supplies electrical power from the host computer to the analog-to-digital timing circuit and the storage buffer.

7. The portable biological data collection system of claim 4, wherein the biological data sensor comprises a gas composition sensor.

8. The portable biological data collection system of claim 7, wherein the gas composition sensor comprises a breath composition sensor.

9. The portable biological data collection system of claim 7, wherein the biological data sensor is selected from a group consisting of a nitrogen sensor, an oxygen sensor, a hydrogen sensor, a carbon dioxide sensor, a carbon monoxide sensor, and an alcohol sensor.

10. The portable biological data collection system of claim 4, wherein the biological data sensor comprises a mouthpiece.

11. The portable biological data collection system of claim 4, wherein the biological data sensor is a non-invasive sensor.

12. The portable biological data collection system of claim 4, wherein the biological data sensor is an invasive sensor.

13. The portable biological data collection system of claim 1, wherein the flexible connection comprises an electrical connection.

14. The portable biological data collection system of claim 13, wherein the portable biological data collection device further comprises a personal computer card housing, wherein the amplifier, the analog-to-digital converter, and the personal computer card interface are disposed within the personal computer card housing.

15. The portable biological data collection system of claim 14, wherein the portable biological data collection device further comprises:

- an analog-to-digital timing circuit disposed within the personal computer card housing for communicating with the analog-to-digital converter for producing a sampling timing signal; and
 - a storage buffer disposed within the personal computer card housing for receiving the digitized signal from the analog-to-digital converter for outputting the digitized signal;
- wherein the personal computer card interface supplies electrical power from the host computer to the analog-to-digital timing circuit and the storage buffer.

16. The portable biological data collection system of claim 13, wherein the biological data sensor comprises at least one microphone.

17. The portable biological data collection system of claim 13, wherein the biological data sensor is selected from a group consisting of a pulse oximetry sensor, a temperature sensor, a blood pressure sensor, an

electrocardiography sensor, an electroencephalography sensor, an echocardiography sensor, a Doppler sensor, a respiratory rate sensor, a pulse rate sensor, a bio-impedance sensor, a blood glucose sensor, a blood cholesterol sensor, a motion sensor, a sound sensor, a heart beat sensor, a weight sensor, an electromyography sensor, an electro-oculogram sensor, and a body fluid sensor.

18. The portable biological data collection device of claim 17, wherein the electrocardiography sensor is selected from a group consisting of a resting electrocardiography sensor, a 24-hour electrocardiography sensor, a stress testing electrocardiography sensor, a signal averaging electrocardiography sensor, an event ECG electrocardiography sensor, and a heart-rate variability electrocardiography sensor.

19. The portable biological data collection system of claim 13, wherein the biological data sensor is adapted to be in contact with skin of the patient.

20. The portable biological data collection system of claim 19, wherein the portable biological data collection device further comprises electrical isolation circuitry disposed between the flexible connection and the amplifier for electrically isolating a patient from the electrical power.

21. The portable biological data collection system of claim 19, wherein the biological data sensor is adapted to be in contact a fingertip of the patient.

22. The portable biological data collection system of claim 13, wherein the biological data sensor is a non-invasive sensor.

23. The portable biological data collection system of claim 13, wherein the biological data sensor is an invasive sensor.

24. The portable biological data collection system of claim 1, wherein the personal computer card interface relays designation data to the host computer for allowing the host computer to identify the biological data to be collected.

25. A portable biological data collection system comprising:
a plurality of biological data sensors adapted to engage with a patient for sensing biological data from the patient; and
a portable biological data collection device connected to the biological data sensors by a plurality of flexible connections, the portable biological data collection device comprising:
an amplifier for amplifying the sensed biological data from the biological data sensors to produce amplified signals;
an analog-to-digital converter for digitizing the amplified signals to produce digitized signals; and
a personal computer card interface for relaying the digitized signals to a host computer on a real-time basis as the biological data is sensed by the biological data sensors, and for supplying electrical power from the host computer to the amplifier and the analog-to-digital converter.

26. The portable biological data collection system of claim 25, wherein the portable biological data collection device further comprises a personal computer card housing, wherein the amplifier, the analog-to-digital converter, and the personal computer card interface are disposed within the personal computer card housing.

27. The portable biological data collection system of claim 26, wherein the portable biological data collection device further comprises:

an analog-to-digital timing circuit disposed within the personal computer card housing for communicating with the analog-to-digital converter for producing a sampling timing signal; and

a storage buffer disposed within the personal computer card housing for receiving the digitized signals from the analog-to-digital converter for outputting the digitized signals;

wherein the personal computer card interface supplies electrical power from the host computer to the analog-to-digital timing circuit and the storage buffer.

28. The portable biological data collection system of claim 26, wherein at least one of the plurality of flexible connections comprises a hollow tube.

29. The portable biological data collection system of claim 26, wherein at least one of the plurality of flexible connections comprises an electrical connection.

30. The portable biological data collection system of claim 25, wherein the personal computer card interface relays designation data to the host computer for allowing the host computer to identify the biological data to be collected for each of the plurality of biological data sensors.

31. A portable biological data collection device comprising:
a biological data sensor adapted to be placed into close proximity with a patient for sensing biological data from the patient;
an amplifier for amplifying the sensed biological data from the biological data sensor to produce an amplified signal;
an analog-to-digital converter for digitizing the amplified signal to produce a digitized signal; and
a personal computer card interface for relaying the digitized signal to a host computer on a real-time basis as the biological data is sensed by the biological data sensor, and for supplying electrical power from the host computer to the amplifier and the analog-to-digital converter.

32. The portable biological data collection device of claim 31 further comprising a personal computer card housing, wherein the amplifier, the analog-to-digital converter, and the personal computer card interface are disposed within the personal computer card housing.

33. The portable biological data collection device of claim 31, wherein the amplifier is disposed on the biological data sensor.

34. The portable biological data collection device of claim 33 further comprising a personal computer card housing, wherein the analog-to-digital

converter, and the personal computer card interface are disposed within the personal computer card housing.

35. The portable biological data collection device of claim 33, wherein the analog-to-digital converter is disposed on the biological data sensor.

36. The portable biological data collection device of claim 35 further comprising a personal computer card housing, wherein the personal computer card interface is disposed within the personal computer card housing.

37. The portable biological data collection device of claim 33 further comprising a filter disposed on the biological data sensor for filtering the amplified signals from the amplifier.

38. The portable biological data collection device of claim 31 further comprising electrical isolation circuitry disposed on the biological data sensor for electrically isolating a patient from the electrical power.

39. The portable biological data collection device of claim 31 further comprising a defibrillator protector disposed on the biological data sensor for providing electrical protection to the portable biological data collection device.

40. A portable biological data collection device comprising:
a sensor-connector end for connecting to a biological data sensor;
signal-conditioning circuitry for receiving biological data from the
biological data sensor for producing a digitized signal; and
a computer-connector end for connecting to a host computer, the
computer-connector end comprising a personal computer

card interface for relaying the digitized signal to the host computer on a real-time basis as the biological data is sensed by the biological data sensor, and for supplying electrical power from the host computer to the signal-conditioning circuitry;

wherein the sensor-connector end is dimensionally larger than the computer-connector end.

41. The portable biological data collection device of claim 40, wherein the sensor-connector end comprises a first housing, and wherein the computer-connector end comprises a second housing, the personal computer card interface being disposed within the second housing.

42. The portable biological data collection device of claim 41, wherein the personal computer card interface comprises a PCMCIA interface, and wherein the second housing is a PCMCIA card housing.

43. The portable biological data collection device of claim 41, wherein the personal computer card interface comprises a compact flash interface, and wherein the second housing is a compact flash card housing.

44. The portable biological data collection device of claim 40, wherein the personal computer card interface relays designation data to the host computer for allowing the host computer to identify the biological data to be collected.

45. The portable biological data collection device of claim 40, wherein the signal-conditioning circuitry comprises:

an amplifier for amplifying the sensed biological data from the biological data sensor to produce an amplified signal; and an analog-to-digital converter for digitizing the amplified signal to produce the digitized signal.

46. The portable biological data collection device of claim 45, wherein the sensor-connector end comprises first housing, the amplifier being disposed within the first housing, and wherein the computer-connector end comprises a second housing, the personal computer card interface being disposed within the second housing.

47. The portable biological data collection device of claim 45, wherein the signal-conditioning circuitry further comprises:

an analog-to-digital timing circuit adapted to communicate with the analog-to-digital converter for producing a sampling timing signal; and

a storage buffer adapted to receive the digitized signal from the analog-to-digital converter for outputting the digitized signal;

wherein the personal computer card interface is further adapted to supply electrical power from the host computer to the analog-to-digital timing circuit and the storage buffer.

48. The portable biological data collection device of claim 47, wherein the sensor-connector end comprises a first housing, the amplifier being disposed within the first housing, and wherein the computer-connector end comprises a second housing, the personal computer card interface being disposed within the second housing.

49. The portable biological data collection device of claim 45, wherein the personal computer card interface relays designation data to the host computer for allowing the host computer to identify the biological data to be collected.

50. The portable biological data collection device of claim 40, wherein the computer-connector end is connectable to an external port of the host computer.

51. The portable biological data collection device of claim 40, further comprising a plurality of stacked circuit boards disposed within the first end housing.

52. The portable biological data collection device of claim 40, further comprising a flexible connection for connecting the sensor-connector end to the biological data sensor.

53. The portable biological data collection device of claim 52, wherein the sensor-connector end comprises a first housing, the flexible connection being connected to the first housing, and wherein the computer-connector end comprises a second housing, the personal computer card interface being disposed within the second housing.

54. The portable biological data collection device of claim 53, wherein the flexible connection comprises a hollow tube.

55. The portable biological data collection device of claim 53, wherein the connection comprises an electrical connection.

56. The portable biological data collection device of claim 52, wherein the personal computer card interface relays designation data to the host computer for allowing the host computer to identify the biological data to be collected.

57. The portable biological data collection device of claim 40, further comprising a plurality of flexible connections for connecting the sensor-connector end to a plurality of biological data sensors.

58. The portable biological data collection device of claim 57, wherein the sensor-connector end comprises a first housing, the flexible connections being connected to the first housing, and wherein the computer-connector end comprises a second housing, the personal computer card interface being disposed within the second housing.

59. The portable biological data collection device of claim 58, wherein at least one of the plurality of flexible connections comprises a hollow tube.

60. The portable biological data collection device of claim 58, wherein at least one of the plurality of flexible connections comprises an electrical connection.

61. The portable biological data collection device of claim 57, wherein the personal computer card interface relays designation data to the host computer for allowing the host computer to identify the biological data to be collected for each of the plurality of biological data sensors.

62. A portable biological data collection system comprising:

- a biological data sensor for engaging a patient for sensing biological data from the patient; and
- a portable biological data collection device for receiving the biological data from the biological data sensor, the portable biological data collection device comprising:
 - signal-conditioning circuitry for receiving the biological data and for producing a digitized signal; and
 - a personal computer card interface for relaying the digitized signal to a host computer on a real-time basis as the biological data is sensed by the biological data sensor, for supplying electrical power from the host computer to the amplifier and the analog-to-digital converter, and for relaying designation data to the host computer for allowing the host computer to identify the biological data to be collected.

63. The portable biological data collection system of claim 62, wherein the portable biological data collection device further comprises a personal computer card housing, wherein the signal-conditioning circuitry and the personal computer card interface are disposed within the personal computer card housing.